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then begs for a bit of the gold that he has dug. But why should he not keep for himself and for his work part of the treasure that he discovers? The applications of electricity due to research work in the laboratory add billions of dollars a year to the wealth of the world. Why cannot scientific men learn how to retain even one per cent of such wealth, which when reinvested in research would again yield high usury to science and to society. It is a long way, but the world does rise slowly in spiral courses to higher levels. The prime mover is scientific research and its applications. Without the commerce and the industry created by science, there could be only a hereditary aristocracy of privilege and wealth controlling slaves. We have now reached the stage where we can at least foresee economic freedom for all. People must be fed and sheltered before they can be happy and free; they must be happy and free before they can be good and wise. Economic liberty must precede intellectual liberty. Science and its applications should be the chief concern of a democratic nation that would preserve its democracy and advance the freedom and the welfare of its people.

J. McKEEN CATTELL, in the *Scientific Monthly.*

EDUCATION FOR SYMMETRY.—Another point is that we find our conventional curricula are occupied chiefly in furnishing students information, and teaching them to think. Those two items cover most of the program of our colleges. But life does not consist simply of thinking. Life includes doing, willing, undertaking. Life demands courage, initiative, resources; it demands such a knowledge of one's powers that he can get only by using those powers, and we come to the conclusion that any educational system is fatally weak which includes only a training in knowing and thinking, and does not include a training in daring, in doing, and in all of those qualities that count in action and undertaking as well as in thinking.

J. H. MORGAN,
Proceedings, Association of American Colleges.

MENTAL TESTS AND COLLEGE TEACHING.—"In tables such as these lies the explanation of the failure of intelligence tests and grades to show a reasonable degree of correspondence. These tables reveal also what should be considered the important college waste heap, the great body of superior students who, content to let their intelligence compensate for idleness, do an almost incredibly small amount of serious intellectual work. The problem of the college lies in this idleness, indifference and wasting of talents.

"The remedy for this situation must be sought in the light of what is brought out by careful studies of the numerous factors involved. A drastic raising of standards is usually the first suggestion. The answer to this proposal is given by a study of the range of ability in the typical university class. Although the wide range of ability found in classes composed of children homogeneous as regards age and school grade has long been recognized in the common schools, it is still in practice almost completely ignored in university teaching. Yet in the typical university class the inter-quartile range extends from students who in general intelligence and in information test well below the average high school senior to students who are not far below the mental level of the average graduate student. In intelligence and information 10 per cent of the class test below the median high school junior, 10 per cent will test at the average level of those who graduate with distinguished honors.

"In the light of such facts, 'raising the standards to make the bright students work' becomes nonsense, unless the instructor is willing to weed out the lower one-half or three-fourths of his class. The public schools are meeting this range of ability by some form of the three track system. In the university this is always difficult and usually impossible. The problem of the university teacher is then, taking his class as he finds it, so to adjust his content and requirements that the largest number will receive the greatest good. If he lowers his requirements, as is usually done, to a point where the lower one-third of his class is able to understand the lectures and carry the required outside work, he will ordinarily leave the upper one-half of his class with little outside work to do, and bore them by the triviality of his lectures in addition. If he raises his requirements and teaches to keep the median student busy and interested, he still has a bored and relatively idle upper quartile, and in addition now an overworked and complaining lower quartile. . .

"The problem of making every student work up to the limit of his power is probably to be solved by the individual instructor without, necessarily, any changes in the present machinery of grading or assigning credits. The difficulty is one that must finally be handled within the classroom, and while changes in academic machinery may make its elimination easier it may be nicely met without them. The track meet, the football game and the officers' training camps of four years ago furnish the solution. The rank of 20 men in sprinting ability and the order in which they cross the line in an intercollegiate meet will show a high correlation. Similarly in the training camp, where the race went to the swift, almost without exception each man worked to the limit of his power. Here are situations where the brilliant man, not satisfied with excelling, strains his powers to increase the margin between his performance and that of his fellows. We can approach the same happy state of things in the college classroom.

"To do it we must first of all 'motivate' the work of the classroom. The psychology of 'motivation' as it is taught may not always be quite clear, but the effect of putting it into practice is readily measurable. Few things are more interesting than asking college students what of value they expect to receive from the courses they are taking. They simply have nothing to say. Yet the instructor who cannot convince his class that the work that he is offering is valuable, interesting and worthy of serious study should ask himself if it is really valuable, interesting and worthy of serious study. The idea of 'selling' a course to one's students is abhorrent, although both students and teacher gain from it. When it is recognized that the systematic arousal of 'drive' and interest is as much a part of the college teacher's work as the retailing of fact, one important step will be taken in the elimination of the ugly college waste heap.

"The bright students will, however, need further attention. Habits of idleness and indifference that have been exercised since kindergarten are not broken in a day. If tactfully approached, students of high intelligence are quite willing to agree with the instructor that they should excel, and they meet goodnaturedly the persistent pressure that is at first needed to hold them to their good resolutions. No instructor interested in controlling human behavior but will find this an engrossing problem.

"Naturally, if effort is to be encouraged, the achievement resulting from it must be accurately measured. The use of some form of the various objective measures of achievement as supplementary to essays and class-room discussions and in the place of the scribbled blue-book, examination is essential. Why, in the light of all that is known of the unreliability of the blue-book examination and its encouragement of cramming and mental vagueness it should continue as the conventional way of measuring achievement, is a question beyond the confines of this discussion.

"For the past three years the Department of Psychology of the University of Washington has experimented with means of securing the maximum good to each student in classes having a wide range of ability. Through the methods discussed in this paper the average correlation for the larger classes in the department has risen from .25 to .53 and is still rising. This high efficiency has been reached in classes of 600 students. In one class of 85 students the correlation of mental ability and grade reached .71, which is higher than the correlation between two intelligence tests in a similar group.

Such results show that the situation is more amenable to correction than one might hope. If university instructors can be induced to handle the problem with energy and intelligence it can be well cared for within the classroom without waiting for the delay of administrative change. If the scientific study of college problems results in coupling up the rather startling energy of the student with his academic work as it now is given to outside activities it will revolutionize the college just as the scientific study of industry has revolutionized production.

WILLIAM R. WILSON, in *School and Society.*

EDUCATION AS AN INDIVIDUAL RIGHT.—"On the other hand, we might continue public support of higher education, forsake the notion that all education is an individual right, and establish in our theory and practice a clear relation between selective education and a strong sense of social obligation on the part of the student. The case for this policy is clear. Society taxes itself for the maintenance of high schools and colleges, not that particular classes or individuals may be raised to positions of privilege and opportunity, but rather that it may secure needed services. Society is making an investment, not bestowing gifts; although the latter may result incidentally from the former. To regard this superior training as an individual right and to turn it primarily to individual ends constitute a gross violation of trust. Those who attend our higher schools are in a real sense the trustees of society. They should consequently be taught to